

REMARKS

Claims 1 and 3-20 are pending and have been examined in the present application. A listing of claims is provided for the Examiner's convenience. No claims have been amended hereby.

In paragraphs 1-38 of the Office Action, claims 1-2, 4-5, 8-9, 12-13, 15-16 and 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,176,453 to Long et al. (Long) in view of European Patent Application Publication No. EP 0919647A1 to NEC Corporation (Okamoto). Applicants respectfully traverse these rejections.

Among the limitations of independent claims 1 and 13 which are neither taught nor suggested in the prior art of record is a composite material heat controller having phase-change substance overlying a base material, "wherein said phase-change substance comprises a thickness in the range of about 1 to about 30 microns." With the claimed phase-change substance thickness, a simple configuration composite heat controller is formed having a light-weight and a broad range of applications with an enhanced degree of freedom (flexibility). See Specification page 7, lines 3-21.

Long teaches a radiator structure comprising a heat source, a radiator element having an inner surface in thermal contact with the heat source, and a coating in contact with the outer surface of the radiator element. See Abstract and Figure 2B. Long fails to teach or suggest a phase-change substance that is about 1 to about 30 microns thick overlying the base material, as admitted in paragraph 5 of the Office Action.

However, Okamoto fails to cure this deficiency. Okamoto teaches that a variable-phase substance can be applied in the form of a film to the heat radiation surfaces of a space vehicle. See Okamoto [0014]. Okamoto teaches that this variable-phase substance is arranged on the heat radiation surfaces as a "several hundred micron thick film." See Okamoto [0017]. Presuming it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat Okamoto's several hundred

micron thick phase-change layer onto the surface of the coated radiator panel taught by Long, the Examiner has not provided a suggestion or motivation in the references to reduce the thickness of the phase-change layer, particularly in light of Okamoto's express teaching that the phase-change layer should be several hundred microns thick.

Both Okamoto and the instant application control the heat in a space vehicle, and thus are in the same field. As in any space vehicle application, Okamoto was motivated to reduce the thickness of its film and thereby reduce the weight. Yet Okamoto teaches that the phase-change layer should be several hundred microns thick. This teaching of Okamoto actually shows a lack of motivation rather than a motivation to reduce the thickness of the phase-change layer as suggested in the Office Action.

Okamoto, as admitted by the Examiner in paragraph 9 of the Office Action, believed that his embodiment was already of light weight, and would not have been motivated to further reduce the thickness of the phase-change layer, to the detriment of that layer's heat removal performance. This paragraph acknowledges that neither Long nor Okamoto teaches a phase-change layer comprising thickness in the range of about 1 to about 30 microns, but fails to state a motivation, as found in the references, to reduce the phase-change layer below the several hundred micron thickness taught by Okamoto.

It was the Applicants who discovered this advantageous claimed feature. The Examiner has offered no evidence whatsoever that such advantages were recognized in the prior art so as to provide for a possible motivation for this modification. As such, no prima facie case of obviousness has been set forth. If the Examiner intends to maintain this rejection, he is requested to explain exactly what teachings in the prior art would have motivated someone to make this modification. The claim that the recited feature is a "results effective variable" amounts to improper hindsight and does not provide the required motivation.

In addition, the Examiner indicated in a previous Office Action (in paper No. 7) that if the applicant "inserts the limitations of claim 2 [regarding the 1-30 micron thickness

of the phase-change layer] into both claims 1 and 13, all of the claims will be allowable over the prior art” of Long and the U.S. Patent Application Publication No. 2001/0027856. In paragraph 3 of the present Office Action, the Examiner noted that Okamoto is equivalent to that U.S. publication. Applicants made this precise change in the previous Response filed May 20, 2003. Therefore, Applicant’s respectfully request that the Examiner provide an explanation for his change from the earlier indication of allowable subject matter.

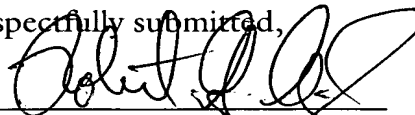
For the foregoing reasons, Applicant’s respectfully submit that a prima facie case of obviousness has not been made, and that independent claims 1 and 13 patentably distinguish over the prior art of record.

Claims 3-12 and 14-20 depend either directly or indirectly from the independent claims 1 and 13, and include all the limitations found therein. Each of these dependent claims include additional limitations which, in combination with the limitations of the claims from which they depend, are neither taught nor suggested in the prior art of record. Accordingly, these claims are likewise patentable.

In view of the foregoing, favorable consideration of the amendment to the claims and allowance of the present application is respectfully and earnestly solicited.

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Respectfully submitted,

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